

Dangerous Listening: The Exposure of Indigenous People to Excessive Noise

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Introduction

Health professionals working with Indigenous people are generally well aware of the widespread conductive hearing loss that occurs, especially among children, because of middle ear disease. Regular exposure to loud noise can also cause hearing loss. Noise-induced hearing loss is commonly found among people who work in noisy industries and environments. About 20% of non-Indigenous Australians are hard-of-hearing. Most of these are over 50 and were exposed to loud noise through work¹. Noise-induced hearing loss is occurring increasingly among children. Research shows there have been significant increases in the number of children in the USA who show signs of noise-induced hearing loss most likely caused by the exposure to loud noise which is now a normal part of their modern lifestyles^{2,3}. Regularly listening to music on iPods and other MP3 players on high volume for a long time can damage hearing.

This article reports the preliminary results of a project¹ that seeks to better understand the noise exposure risks in many Indigenous lifestyles. Information on exposure to loud noise was gathered in two ways. Firstly, noise exposure surveys were carried out with Indigenous people, mostly in the Northern Territory but with some respondents from other states included. Secondly, people's actual exposure to loud

noise was measured using noise dosimeters in a variety of homes.

An occupational sound exposure level of no more than 85 decibels (dB) averaged over an 8 hour working day ($L_{Aeq} 8h < 85$ dB) or equivalent is the international criteria adopted by many countries including Australia and New Zealand. This is termed 100% doseⁱⁱ and can be described as the level of acoustic energy received by the person which should not be exceeded. This has been called the 'allowable daily exposure' (ADE). There is considered to be a significant risk of noise-induced hearing loss in the majority of persons exposed to levels which exceed this criterion on a long term basis^A. The table below, used in occupational noise assessment, clearly defines the time average levels and corresponding time exposures, all of which are of equivalent acoustic energy (i.e. 100% dose)ⁱⁱⁱ. If the time average sound pressure levels are in excess of 85 db over an 8 hour day then the time exposed must be correspondingly reduced so that exposure does not exceed the 100% dose. For each additional 3 dB the allowable time exposure to the noise level is halved.

These are considered safe noise exposure times for different noise levels for adults in occupational settings over an 8 hour period^{iv}. It is unclear what the 'safe' level of noise exposure is for children but is widely thought that children's hearing is more vulnerable to damage

Time average level L_{Aeq}	Time exposed hours	Types of activities ^B
85 dB	8	Sitting close (within one metre) to TV on moderately high volume or mobile phone on speaker held in front of face.
88 dB	4	Listening to music on CD/DVD through TV on high volume sitting close.
91 dB	2	Someone shouting close to you, sitting close to stereo on moderate volume, listening to music on mobile phone on speaker function held close to an ear.
94 dB	1	Being 3 metres away from stereo on high volume or listening to music on personal listening device (mobile phone) through headphones volume on high.
97 dB	0.5 (30 mins)	Sitting close to stereo on moderately high volume,
100 dB	0.25 (15 mins)	Being 2 metres away from stereo on maximum volume, being at disco, people screaming close to you, listening to music on some personal listening devices using earbud headphones on maximum volume.

A It should be remembered that this is based on a five day 8 hour working day. However, people spend longer in home environments. Those who are unemployed or attend school irregularly spend even longer than others at home or in others' homes.

B Note these are general indications only and there can be variation of noise exposure depending, for example, on type of equipment and settings. Also some activities in the 100 dB section often involve louder noise levels than 100 dB, as outlined later in article.

from excessive noise. The World Health Organization⁴ outlines studies of laboratory animals which support this⁴.

Damage to hearing through noise exposure generally happens over time. The “accumulated effect of hours, days and years of exposure all contribute to an individual’s hearing damage and subsequent hearing loss”⁵. This means exposure to loud noise regularly, early in life is of special concern. Some excessively noisy toys have created concern such as toy guns, juke boxes, whistles, clackers and rattles⁶. Likewise the extensive use of personal listening devices such as iPods and MP3 players has raised cause for serious concern⁷. It is not only the volume that is used but the length of time users can now listen. The earlier generation of personal listening devices such as the walkman or disc man could not be so easily used continuously for many hours as can the modern devices because they had less battery and storage capacity.

Noise Exposure in Indigenous Lifestyles

There are consistent trends emerging from the early results of this present investigation into the exposure of Indigenous people to loud noise. The trends suggest that for many Indigenous people, including young children, the level of persistent exposure to loud noise, especially in some home environments, creates significant risks of eventual sensori-neural hearing loss related to excessive noise exposure.

There are multiple factors contributing to excessive noise exposure among Indigenous people. They have greater access now to potentially louder TVs, amplifiers, personal listening devices and electronic games. The availability of these items in Australia has increased in the last ten years. The potential volume of noise from increasingly less expensive electronic goods, in combination with the increased use of mobile phones as personal listening devices, has dramatically altered the noise exposure profile in a majority of Indigenous households.

Crowded housing is another important consideration. Noise levels can be chronically high in crowded housing and especially so in households where many of the residents have existing hearing loss from childhood middle ear disease. People with hearing loss often behave in ways which generate loud noise. They tend to turn up the volume of electronic devices to higher levels than those with normal hearing. The result is a significant increase in non-occupational noise exposure for Indigenous families in recent years.

The results indicate that there is an urgent need for the development and implementation of hearing conservation health promotion programs for Indigenous people.

Listening ‘Loud’

Attendance at ‘discos’ and concerts constitutes the greatest risk of excessive noise exposure in non-occupational settings for young people living ‘mainstream’ Australian lifestyles⁵. In urban, regional and remote areas Indigenous youth attend discos or regular locally organised concerts. In many Indigenous communities there are also twice weekly or fortnightly house parties where the noise exposure level can be similar to, or even greater than, that found in discos.

At some house parties noise was recorded at decibel levels equating to those in discos (for example, at one party the recorded average noise exposure was 105 decibels; the same as for a person at an urban disco). However, while people generally stay at a disco for only two to three hours, house parties often go on for up to five hours, or longer. Young people choose to attend discos, but household parties take place where families live. Whole families, including young children can be exposed to loud noise for long periods. A child exposed to an average noise level of 105 dB for five hours would receive more than 40 times the ADE (allowable daily

exposure) for an adult in an occupational setting. Long distance car trips are another family activity, common in some areas, where loud music may be played for many hours – with people frequently shouting over the music to communicate.

This project has found that for Indigenous people there is not only greater risk of excessive exposure to loud noise from music than there is in ‘mainstream’ communities, but also that fewer people know that excessive exposure to loud noise can damage hearing.

The results indicate that there is an urgent need for health promotion programs which alert Indigenous communities to the risks of excessive noise exposure and extended periods of listening to loud music.

Noisy Electronic Childcare

The greater availability of loud electronic devices has dramatically altered the noise exposure profile for Indigenous children. There has also been increased ‘viewer choice’ in television (cable, DVD and more free-to-air channels). As a result, there is now more TV content that is of high interest to children. Cheaper TVs have meant that TVs are often now in bedrooms, and used only by children in situations where there is minimal adult control over volume. Children’s greater access to, and control of, the volume of electronic noise, when combined with the presence in crowded households of many children with conductive hearing loss who like to ‘listen loud’, has helped contribute to what can be described as recurrent ‘noise-storms’ in many households where electronic equipment and devices have often become an element of usual childcare arrangements. The result is that some children are often exposed to noise that exceeds ADE limits.

Some respondents spoke of urbanisation and loss of contact with extended family as a factor which can exacerbate noise levels and noise exposure in some families. Childcare in extended family settings is usually shared. The sharing of childcare responsibilities gives people more flexibility to manage work or other responsibilities. Where extended family support is not available, some of those surveyed spoke of greater use of electronic entertainment equipment as part of their childcare arrangements. Their children spent more time in front of television screens or listening to music than they would otherwise have done.

One family had two children who were born and spent their early years in a remote community. The family then moved to an urban area, where three more children were born. The older children had far less noise exposure in their early years than all the children experience now. In the remote community there was no TV coverage when the children were small. People there may have watched a DVD once or twice a week. After school and at weekends children were most often out of the home and free to play with same-age relations over a wide area in what was seen as a safe environment. Extended family members were readily available to help with child care when needed.

The family now lives in an urban environment. After school and at the weekend the children are most often at home, indoors, watching TV. They spend up to 12 hours a day on weekends and up to six hours a day on school days watching either cable TV on a flat screen TV in a small enclosed bedroom or a mixture of cable and free-to-air on an older TV in the lounge room. Two younger children with a history of ear disease set the volume on maximum when they control what is watched, and sit within a meter of the TV. The older children generally have the TV at a lower volume and sit further back. Communication between family members is often in the form of screaming over the noise of the TV – to express sibling irritation or some desire

they may have. The disputes are often over whose turn it is to use two small hand held games while watching TV. Sound level measurements and noise survey information indicate that the children, especially the younger children, are frequently exposed to more than the safe daily 'adult' occupational noise exposure limits, in their home environment.

Mobile Phones as Personal Listening Devices

The use of personal listening devices, especially by young people, is another reason for the increasing concern about the risks of noise-induced hearing loss in Australia and elsewhere⁸. Use of iPods and other 'music only' listening devices were not common for most of the Indigenous people interviewed during this study. However, the use of mobile phones as personal listening devices^c was widespread. Mobile phones are an increasing presence in the lives of the people who were interviewed. They help with regular communication between family and friends; when people run out of credit on the prepaid services they often use they can still use the phone to play music.

Adults' mobile phones were commonly passed around children in the family, and were a favorite 'toy' for some toddlers. Large families often had many phones – one home with twenty-two residents, including twelve children, had eight mobile phones in use among family members^d. One elder said the mobile phones helped 'keep children safe' – by entertaining them so they are happy to stay at home, rather than going out to places where they may be at risk of physical or emotional harm. While indirectly protecting the children from physical harm this method of doing so may contribute to an increased long-term risk of hearing loss; a risk that family members were not aware of.

The survey participants often said that mobile phones are used as a form of 'pacifier' (a 'noise dummy') for young children. Toddlers are given a mobile phone playing music to distract and placate them, especially if distressed. Some parents commented that children whose behaviour was hard to manage were often 'quieted' by giving them a phone playing music. It was common for young children to go to sleep with a mobile phone next to them and the speaker function turned on.

Some young children listen to music with the phone speaker function switched to the maximum volume, mostly holding the phone 15–20 cm from their face but sometimes holding it directly against an ear (the high background noise levels in homes and use of these phones as group listening devices meant that the volume was often on maximum when passed to the children). In one example, a mobile phone on maximum volume held in front of the face and about 15–20 cm from an ear produced sound at a level of 75–84 dB. This level of noise exposure is equivalent to standing near industrial machinery or a truck. The same phone held close to the ear produced a sound level of 86–92 dB (the noise level near a motorbike engine). Those interviewed said young children would often listen to music on mobile phones for many hours during a day ("they listen 'til the battery run down" – around three hours if fully charged) and would often go to sleep with the phone next to their head.

Older children would listen to mobile phones using the speaker function if in a group, but commonly also used headphones – often

for many hours. Listening to music through headphones with the volume at, or near, maximum level was described as a useful way to block out other noise in and around noisy households. Listening to music on personal listening devices on maximum volume using 'ear buds' for more than 15 minutes a day can damage hearing⁹ over a long period of time. Using the above occupational criteria as a guide, listening to a personal listening device delivering music to the ear at 94 dB it would only take one hour before the 100% dose level was reached. If the device delivers music at 97 dB that threshold is reached in only 30 minutes. As these devices are capable of delivering such sound levels to the ear it is clear that very real damage is possible. This does not take into account the more sensitive nature of young ears to those of an adult.

The loud background noise levels common in crowded Indigenous households are an important influence on the volume at which music is played on personal listening devices. When it was noisier, the volume on mobile phones with headphones was turned up, or if the sound was already set on the maximum volume, the phone was held closer to the ear. Either action will increase the noise exposure level. When the noise source was close to the ear, individuals were exposed to loud noise in a way that was mostly unnoticed and unobtrusive for other family members. Listening devices were also sometimes used by parents to help manage unruly children; children whose behaviour was hard to manage being 'quieted' by giving them a phone to listen to music on.

These results suggest that the way personal listening devices are used in often crowded, noisy home environments places many Indigenous people at greater risk of excessive noise exposure and resultant noise-induced hearing loss than is the case for non-Indigenous people in Australia.

Crowded Housing

Crowded housing is a feature of many Indigenous lifestyles¹⁰. It often results in noisy home environments. The predisposing factors for crowding in Indigenous households were described by those surveyed as follows:

- Limited available housing was the major factor for people in houses which commonly accommodate twenty to thirty people.
- Cultural preferences for 'connectedness' mean that people often seek to spend time together and visit others during the day.
- Family visits by relatives can often double or treble the number of people occupying a house, for weeks or months during the year^e.
- People tend to congregate in the houses with desirable items or activities: hi-fi equipment, cable TV, card games.
- The youthful demographic profile of Indigenous families means they have more young children than most non-Indigenous families.
- High levels of alcohol consumption by some community members results in children being cared for by other family or community members; some households care for many children.
- Concerns for the safety of children mean that families may keep children at home or allow them to play at only a few 'safe houses' – where drinking is not a problem and/or there is known to be responsible supervision of children.
- There are certain houses where people gather to drink alcohol, or where they go when drunk. There is more likely to be excessive noise from loud music and shouting in these houses.

C Unlike most other personal listening devices mobile phones do not require links to computers and broadband to load and play music. Many disadvantaged Indigenous households do not have access to computers.

D This example is from a community with mobile phone coverage. In communities without this coverage mobile phones were understandably rare.

E These visits, which regularly contribute to excessive overcrowding, are influenced by limited housing availability, cultural responsibilities to provide hospitality and the desire to maintain family connections.

Mutual Noise Exposure

When a number of adults and children are in close proximity there tends to be greater exposure of adults to noise from children's activities and greater exposure of children to noise from adult activity.

In Indigenous families, children and adults are often in the same place or space but engaged in separate activities. Groups of children will play after school and at weekends in 'safe houses' – running around and through the house (often shouting and screaming as they do this). The noise survey results indicate that the shouting and screaming of children is one of the most common 'noisy' activities in the surveyed Indigenous households. Shouting was recorded at around 90 dB when standing close to the person who was shouting. Screams were recorded at between 90 and 127 dB, both for someone close to the person screaming and for the 'screamer'. Analysis of the results reveals that in some households some children and carers can receive more than the allowable daily noise exposure limits from shouting and screaming when children are not at school. This noise exposure adds to the noise exposure which children experience in child care and at school. If children are also exposed to loud noise in these places they may not have enough of the 'recovery time' that ears need after being exposed to loud noise.

Children are also often exposed to high noise levels from adult activities – generated by both interpersonal exchanges and the use of electronic and entertainment equipment.

Two unemployed single mothers spoke about watching daytime TV with the volume turned up about half way. After the children arrived home and began playing and running outside and through the house the mothers turn the volume on the TV up to the maximum output. The noise exposure for children in the household over a seven hour period after school one day exceeded the ADE.

The most extreme (and concerning) example of children's exposure to adult generated noise in the survey data was the use of firearms from vehicles in which whole family groups were passengers.

In some families hunting occurs when travelling so that the whole family, including babies and young children, are exposed to noise from guns fired from the front passenger seat. "When we go travelling in country we have to watch that old man because he sees kangaroo and shoots him quick. You got to watch him to put your hands over your ears real quick". If not sufficiently alert and able to cover their ears, passengers are exposed to the unmuffled sound of a gun used in close proximity and fired in a confined and enclosed space. When children are too young to cover their own ears, carers must choose between protecting themselves or the child. Repeated exposure to the noise of discharging firearms is a common cause of permanent hearing loss.

A 'Critical Mass' of Individuals with Hearing Loss in Households

The noise created when a 'critical mass' of residents with existing hearing loss live in one household contributes to a heightened risk of future hearing loss for residents with no current hearing loss or only unilateral hearing loss.

It is known that crowded housing increases the risks of conductive hearing loss by enabling cross-infection among children with middle ear disease¹¹. The results of this study indicate that when a high proportion of people with existing hearing loss live in a crowded house, noise generated by the people with conductive

hearing loss and the 'crowd' of residents may contribute to sensori-neural hearing loss among other family members. The people with existing hearing loss are often the most active initial generators of excessive noise (shouting, screaming and turning up the volume of TV and music devices).

"My husband had lots of ear problems growing up and has a hearing loss now, and two of my five children have had ear problems for years. It's them who always want the TV up loud and it's the kids with ear problems who are the ones often shouting and screaming over the TV. It's those kids with ear problems and my husband who are the ones are making most noise in our family". – Indigenous mother.

Similar noise generating behaviour is evident in non-Indigenous homes where there are people with hearing loss. However, the non-Indigenous hard-of-hearing are fewer in number and mostly over 50. They do not as often cohabit with others with hearing loss, in large households, or with children. This means non-Indigenous hard-of-hearing people are not as likely to encounter competing noise from other hard-of-hearing individuals.

In contrast, in many Indigenous families it is usual to find adults with hearing loss who share a home with a number of children who have mild to moderate levels of hearing loss. This can, and often does, result in an escalation of 'competing'^F noise – all become noisier than they would otherwise be. The noise survey results and noise level measurements confirm that higher noise exposure profiles are present in many Indigenous households when many of the individuals are hard-of-hearing. This results in the exposure of those with no, or minimal, existing conductive hearing loss to potentially damaging levels of loud sound, and the risk of sensori-neural hearing loss in households where there is a 'critical mass' of residents with hearing loss.

Expert opinion^{vi} suggests that those with bilateral conductive hearing loss are largely protected from sensori-neural hearing loss as a result of excessive noise exposure. However, the noise generated by those people can jeopardise the better hearing of other family members with normal hearing or unilateral (one ear) conductive hearing loss. In recent years the capacity of those with hearing loss to generate noise has increased as their access to potentially very noisy electronic equipment has increased (flat screen TVs, hi-fi systems, games and personal listening devices).

Exposure to loud noise for those who are most at risk of sensori-neural hearing loss is often through 'passive noise exposure'. Like 'passive smoking', which results from proximity to smokers, 'passive noise exposure' occurs when people are in environments where others are generating excessive noise. However, unlike smokers who put their own as well as others health at risk, many of those generating excessive noise in Indigenous households are protected from the risks themselves, because their preexisting conductive hearing helps to protect them from noise-induced hearing loss.

The survey data also indicates that some individuals with a history of ear disease but no current hearing loss tend to listen to electronic noise for longer and at louder volumes than those without such a history. This appears to be because:

- Firstly, there is evidence that children with a history of ear disease, but with no current hearing loss, tend to turn the volume of TVs and music to higher levels than other children do. Children with a history of ear disease but normal hearing commonly have greater difficulty when coping with background noise¹². They appear

F The 'Lombard effect' is the involuntary tendency of speakers to increase the intensity of their voice when speaking in a noisy environment. When listening to music or TV in an environment where there is competing noise, people turn the volume up so they can better hear what they are listening to.

to need higher volumes of sound to hear clearly and override background noise.

- Secondly, some children with a history of ear disease may listen to electronic devices to avoid challenging social situations. Children with a history of ear disease tend to experience more social difficulties¹³.

This suggests that children with a history of ear disease but no current hearing loss may be at higher risk of excessive noise exposure than other children.

Different Electronic Noise Exposure Profiles

The results of this study reveal quite different profiles of exposure to loud noise in different homes and in different communities.

- When fewer people live in a house the noise exposure levels tended to be less than in homes where many people live.
- Noise levels tend to be higher in homes where the residents include people with conductive hearing loss.
- The noisiest houses are the ones with the most people and where there are also more people with conductive hearing loss.

Some examples of 'at-risk' household noise exposure profiles are listed below.

1. In many of the homes in some remote communities hi-fi systems on high volume were used every afternoon and evening, often for up to 8 to 12 hours each day. This exposes the whole family to loud music.
2. In many communities there were regular weekly house parties where noise levels were similar to those generated at discos, but where those present were exposed to the noise for longer than would generally be the case for people going to discos.
3. In a number of remote communities there are weekly or twice weekly local discos. These are a major social event which the older children and teenagers in the community attend. They add to the cumulative noise exposure from watching TV and listening to music for many hours during the rest of the week.
4. In one urban home with six children and two adults, there was high volume noise from multiple TVs for long hours (including use of the DVD to play music CDs through the TV). Noise from weekend or after school use of the TV, together with shouting and screaming in competition with the TV noise, regularly exceeded the ADE limits for the children in this home.
5. In one family of 12 children and 8 adults living in a town camp, there is a single TV. The stereo system was broken. Instead, eight mobile phones were shared. Most were in constant use for many hours throughout the day; to listen to music, either individually or in groups. Noise doses were measured at 75-86 dB if near the face and 86-92 dB if close to an ear. Exposure using headphones would often be higher. The volume was often set at, or close to, the maximum level to over-ride competing noise.
6. In one family, teenage girls and their friends listened to music on the verandah of a house for long periods, especially at weekends, while sitting close to a hi-fi system. Their personal noise exposure in this situation was measured at consistently above 85 dB. They would take an occasional break to go swimming at the nearby pool. The noise levels at the pool were also often high (above 85 dB) because of the many children screaming and shouting. When not listening to music as a group, the girls often listened to music on mobile phones with headphones. The girls' daily noise exposure often exceeded allowable daily exposure limits (ADE),

especially during weekends.

7. In one remote community there was only one house with a loud hi-fi system. However, there were a number of vehicles with loud sound systems. It was common for these vehicles, filled with passengers, to be driven round and round the small community with windows shut and music playing at maximum volume, for up to, and sometimes longer than, four hours during the afternoons and evenings. The measured passenger noise exposure level was over 90 dB. This activity alone exceeded ADE levels for participants.

The levels of electronic 'background noise' in all these settings meant that communication between people would often involve attempts to shout or scream over the other noise. It was not uncommon for people to describe ringing in their ears (a sign of acoustic distress) after time spent with people who were shouting and screaming. The frequent shouting and screaming adds to the overall 'loud noise exposure' from other sources which was found in many homes. When people are exposed to combinations of loud noise (shouting and screaming, television and music) consistently over many years, from a young age, in the home environment, they face a significant risk of future hearing loss.

Discussion

Excessive noise exposure does not usually have an immediate permanent effect on hearing, although people may have a temporary change in hearing⁶ for some hours after being exposed to excessive noise, frequently together with ringing in their ears. A permanent effect on hearing capacity generally happens progressively and only becomes evident some years later, after consistent exposure to excessive noise. Adult workers exposed to excessive noise during their working years often experience hearing loss in their 50s. However, there is now widespread concern that teenagers who regularly listen to loud music at concerts and on personal listening devices are experiencing sensori-neural hearing loss at an earlier age⁸.

The preliminary findings from the present study are cause for serious concern. While it is generally thought that domestic noise does not result in exposure to excessive noise, except perhaps in the case of some teenagers using personal amplification devices, the results show that many Indigenous people are exposed to loud noise for long periods in their home environments. Crowded housing, the high proportion of Indigenous people with conductive hearing loss and easier access to noise-generating entertainment equipment appear to result in an extreme noise exposure profile in many Indigenous households. In addition, high levels of unemployment and low school attendance rates also mean that many Indigenous people will often spend a considerable amount of time in and around the home.

The results indicate that there is excessive noise exposure among quite young Indigenous children. They may, as a result, experience permanent hearing loss in early adulthood. It will affect them for the rest of their lives. Hearing loss experienced during the years when most people make the most productive contribution to their family and community (through involvement in work and child rearing) usually has a greater impact on the individual and their community than does later onset hearing loss¹. The consistent early exposure of young Indigenous children to excessive noise is the most alarming and concerning feature of the preliminary results from this project.

In addition to the risk of hearing loss, exposure to excessive noise can have other adverse outcomes.

G It can feel to people like they have cotton wool plugs in their ears and it can take up to 16 hours for hearing to recover.

- Children may have more difficulties with reading and recall (memory)^{14, 4}.
- Adults may experience more depression¹⁵, and more cardiovascular disease¹⁶.
- In Australia, research findings indicate that Indigenous children with conductive hearing loss display more antisocial behaviour when it is noisy in classrooms¹³.

Persistent exposure to excessive noise may be a hitherto little recognised contributing factor to these elements of Indigenous disadvantage.

The identified noise exposure patterns have important implications. The results suggest that action to limit the exposure of Indigenous people to excessive noise is an urgent priority. There is already widespread conductive hearing loss in the Indigenous community – caused by endemic middle ear disease. This is the ‘first wave’ of preventable hearing loss. What this study is showing is that there may be a ‘second wave’ of preventable noise-induced sensori-neural hearing loss for those in Indigenous communities. It is building now. Urgent action is needed to prevent this ‘second wave’ of hearing loss in Indigenous communities.

The risks from excessive noise in Indigenous households are often a family problem and there is a need for family-based solutions^{vii}. Indigenous families need information on the potential dangers of contained and repeated noise; from firearms, from listening too long to loud music (whether at discos, house parties, using personal listening devices, or driving), from TVs, from persistent shouting and screaming. Programs will need to target the risks of ‘passive noise exposure’ by focusing on the behaviors of those with existing hearing loss and the need to ‘look after whole family’s hearing’. Indigenous health workers have an important role to play in the development and implementation of these programs. They will often be the ones who can best inform families about the danger of too much loud noise, and of the particular dangers for children with a history of ear disease to exposure to loud noise, for too long.

Notes

- This research was funded by the Commonwealth Department of Health and Ageing
- or 1.0 pascal squared hour in acoustical terms
- Sound pressure levels (in decibels) are measured in a logarithmic scale which creates some issues when working with these figures.
- These refer to continuous noise exposure. Such continuous noise exposure is more typical of occupational noise exposures while many types of recreational noise exposure (such as shouting and screaming) are more spasmodic.
- In regards to a safe level the WHO¹⁷ has stated that there is insufficient evidence to prescribe a safe level due to lack of evidence and individual sensitivities which will vary widely across populations. However the WHO suggest that a lifetime exposure of average level of less than 70 dB is unlikely to cause any significant damage in the greater population even over a 24 hour exposure. (LAeq 24 h < 70 dB)
- Lou Leidwinger is an audiologist with many years’ experience working with Indigenous people.
- There are also implications for other noise exposure reduction strategies, for example in the standards set for housing built for Indigenous people. Music is often played, and TV watched, in bedrooms as well as in living areas. As far as possible, houses should be built to minimise possible noise transfers between rooms – to limit competing noise sources and the resulting use of personal listening devices to block out background noise at night.

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Agencies interested in participating in ‘keeping hearing strong’ programs can contact Damien Howard at damien@phoenixconsulting.com.au.